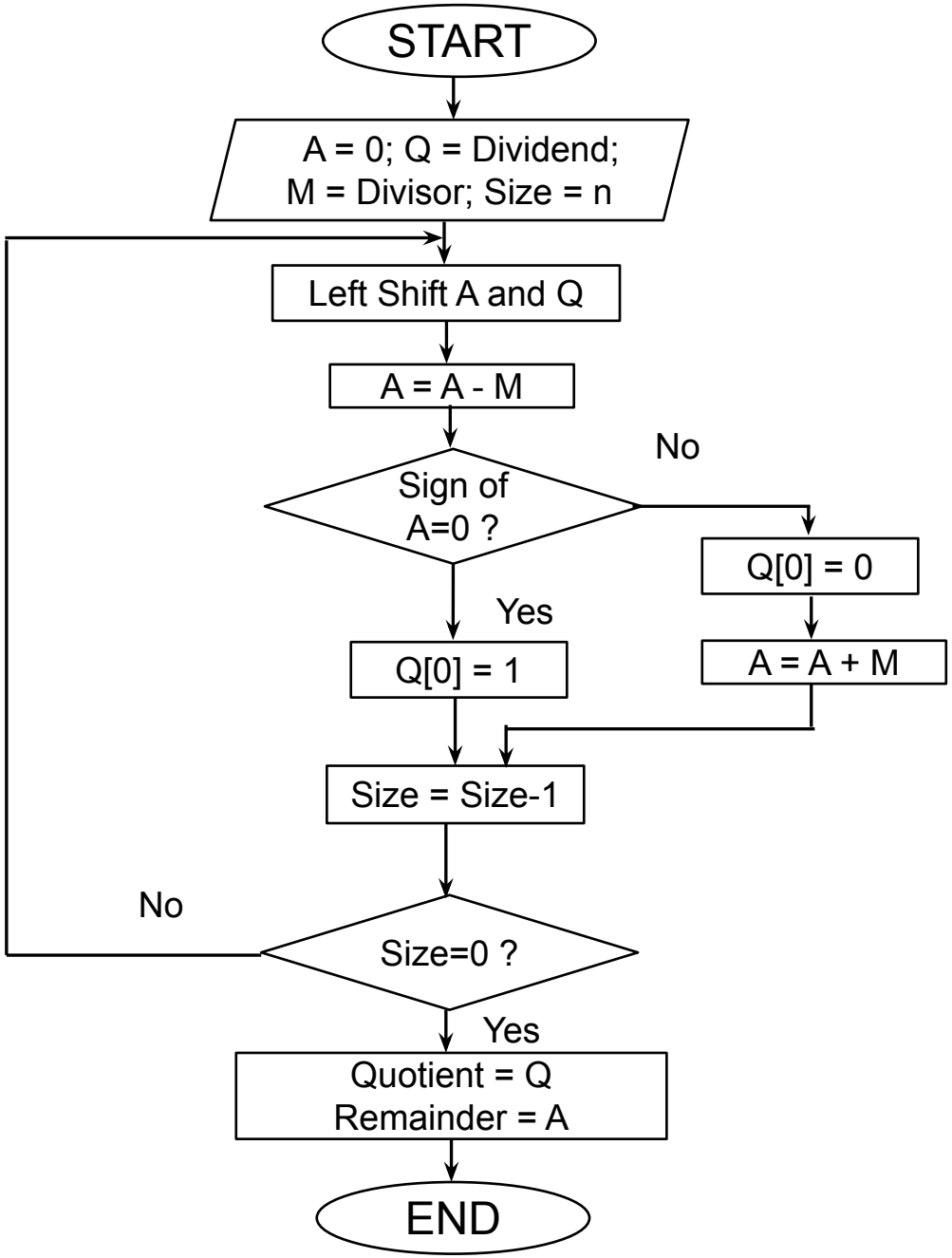
Restoring Division Flow chart



Restoring Division Example

M = 3, Q = 7 M = 00011

Q = -M =

A	Q	Size	Comment
0111	11101		
00000	0111	4	initialize
00000	111	4	Left Shift A and Q
11101			
11101	111	4	A=A-M
00011			
00000	111 0	3	Set Q[0]=0 and A=A+M
00001	11 0	3	Left Shift A and Q
11101			
11110	11 0	3	A=A-M
00011			
00001	11 0 0	2	Set Q[0]=0 and A=A+M
00011	1 0 0	2	Left Shift A and Q
11101			
00000	1 0 0	2	A=A-M
00000	1 0 0 1	1	Set Q[0]=1
00001	0 0 1	1	Left Shift A and Q
11101			
11110	0 0 1	1	A=A-M
00011			
00001	0 0 1 0	0	Set Q[0]=0 and A=A+M

Remainder

Quotient

Restoring Division Example

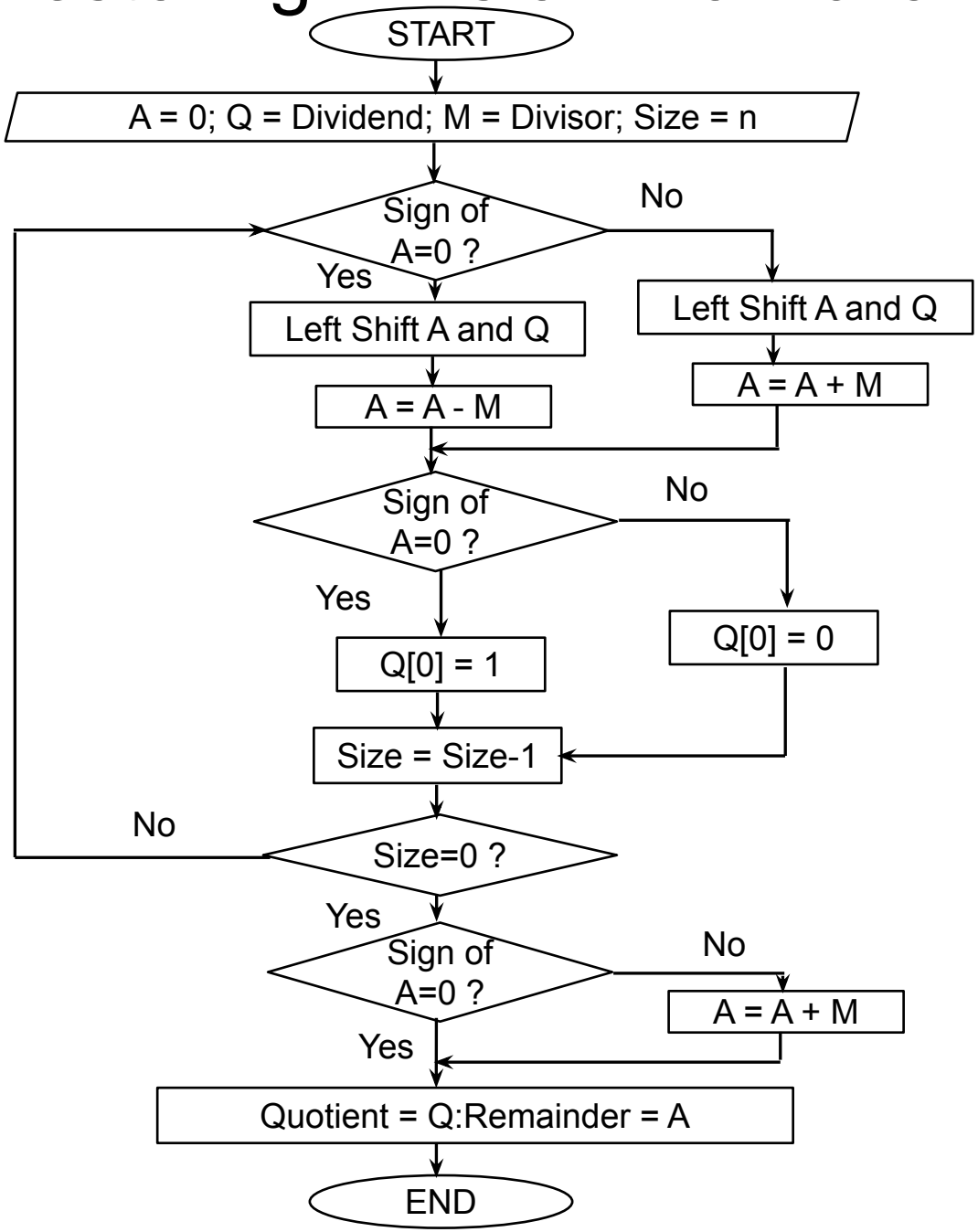
Divide 6 by 2

M=2 Q=6

M=00010 Q=0110

-M=11110

Non-Restoring Division Flow chart



Non-Restoring Division Example

M = 3, Q = 7 M = 00011

Q = -M =

A Q11101

0111

		Size	Comment
00000	0111	4	Initialize
00000	111	4	Left Shift A and Q
11101			
11101	111	4	A=A-M
11101	111 0	3	Set Q[0]=0
11011	11 0	3	Left Shift A and Q
00011			
11110	11 0	3	A=A+M
11110	11 0 0	2	Set Q[0]=0
11101	1 0 0	2	Left Shift A and Q
00011			
00000	1 0 0	2	A=A+M
00000	1 0 0 1	1	Set Q[0]=1
00001	0 0 1	1	Left Shift A and Q
11101			
11110	0 0 1	1	A=A-M
11110	0 0 1 0	0	Set Q[0]=0
00011			
00001	Quotient		

Remainder

Advantage and disadvantage of Non-Restoring division over restoring division

The advantage of using non-restoring division over the standard restoring division is that a test subtraction is not required;
The sign bit determines whether an addition or subtraction is used.
Less number of addition/ subtraction are required.

The disadvantage, though, is that an extra bit must be maintained in the partial remainder to keep track of the sign.

Non-Restoring Division Example

Divide 6 by 2

M=2 Q=6

M=00010 Q=0110

-M=11110

Thank You